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Remarks on Silver Ore from Colorado, by GEO. A. KÖNIG.—I had an opportunity, lately, to test a silver ore from Coinload, Colorado, and was astonished at the beautiful crimson and flesh-colored incrustation, which was obtained by treating the ore with the point of the inner flame on charcoal. The crimson was most intense in a zone immediately following the yellow incrustation of lead, it went gradually through different shades of flesh-color into the white incrustation produced by the teroxyd of antimony. The ore was composed of Galena and antimoniferous ruby silver. After a number of experiments with pure ruby silver from Andreasberg, pure Galena, and pure sulphide of antimony, I found that a crimson color could only be produced by the presence of all three compounds, or an alloy of silver, lead, and antimony; and that it appeared only just before the silver button had become nearly pure. Now, if we consider that silver alone, when kept in fusion by a strong oxydizing flame, deposits a brown coating in the immediate neighborhood of the button, that lead produces an incrustation of plumbic oxyd, which is of a dark yellow color while hot and a lighter yellow in the cold, and lastly, that antimony gives rise to a copious white coating, at some distance from the flame, of antimony teroxyd, it seems striking that the three metals together should produce a *crimson* incrustation. A mechanical mixture of the three oxyds—brown, yellow, and white, cannot be supposed to bring about a crimson color. Also the fact, that only then this color appears, when the silver is nearly pure is suggestive of a peculiar chemical combination, formed of the oxydized metals as soon as these are brought into a certain quantitative relation.

At the same time it must be inferred that the volatility of silver is increased to a considerable amount when this quantitative relation is reached. This latter reflection might throw, perhaps, some light upon the inaccuracy of the cupelling assay in certain cases, where the loss of silver is larger than usually.

It seems to me of some interest to investigate into the nature of this crimson-colored compound, and I hope to be able to lay before the Academy some positive results regarding it, at an early date. The observation of crimson-colored incrustations from silver ores containing lead and antimony is not new. Prof. Richter mentions them in the last edition of "*Plattner's Probirkunst vor dem Loethrohr*," Leipzig, 1865, page 84. But as to the real cause, there has no publication been made, so far as my knowledge goes.

The death of Samuel Emlen Randolph was announced.

DECEMBER 17.

Dr. J. L. LeCONTE in the chair.

Nineteen members present.

Prof. COPE made some remarks on the Geology of Wyoming, especially with reference to the age of the coal series of Bitter Creek. He said that the discovery of the Dinosaur *Agathaumas sylvestris* had settled the question of age, concerning which there had been much difference of opinion, in favor of the view that they constitute an upper member of the Cretaceous series. In the sections made, he had succeeded in tracing the line of demarcation between these and the lower beds of the Green River epoch, and had found the leaf beds of the former to be immediately covered by deposits of mammalian remains, with an interval of a few feet only. In the same way, the close approximation of the Evanston cretaceous coal to tertiary strata was determined by the finding of numerous mammalian and reptilian remains in the lower part of the Wahsatch beds of Hayden, or even in the sandstones overlying the coal. Here two species of *Bathmodon* were found, corresponding with the nearly allied genus *Metalophodon* from the Bitter Creek locality. So far as is yet known, the *Bathmodontidæ* are diagnostic of the Green River formation, and, on this and other grounds, the Wahsatch beds of Evanston were regarded as belonging to it. A further extension of the Green River formation was found at a point 400 miles westward (see Proc. Am. Philos. Soc., July, 1872), near Elko, Nevada, where fishes and insects occur in thin shales. Some of the former are nearly allied to species from the fish beds of Green River.

He added that exception had been taken to his claiming the final determination of the cretaceous age of the Bitter Creek coal strata (see Silliman's Journal, 1872, Dec., p. 489); his critics presuming that he was unacquainted with previous publications on the subject. It was, however, his knowledge that previous authors had expressed either adverse or doubtful opinions respecting it, that induced him to print the short preliminary notes that had appeared. He was well aware that Messrs. King and Emmons had considered the lower part of these beds as cretaceous, and the *upper as tertiary* (see Exploration 40th Parallel, III. p. 458), on stratigraphic grounds. Since the cretaceous was represented in different parts of the country by clays, sands, glauconite, chalk, limestone, and sandstone, he thought that palæontological evidence was needed to complete the demonstration. This had not been produced for the locality in question, but the nearest point (Hallville) had been called Tertiary by Mr. Meek, and Prof. Lesquereaux (Hayden's Survey of Terrs., 1870, p. 306) had considered the fossil flora of Point of Rocks, forty miles westward, as of "unknown age," and those of Evanston as *miocene*. Hayden himself is well known to regard the strata as of uncertain or transitional age. Palæontological determinations of cretaceous age of the Bitter Creek series were very indefinite up to the publication in question. But first he would remark, that his critic was doubtless uninformed as to the geography of Wyoming, when he cited Prof. Marsh's determination of the cretaceous age of the coal of Brush Creek, a

locality from 150 to 200 miles distant. So with the determinations from Weber River (Coalville) 200 miles, and Evanston and Sulphur Creek 150 miles distant, on the opposite side of the Bridger Basin. He did not regard these as determinations affecting the age of the Bitter Creek Beds any more than they did of the Eocene coal of Osino, 200 miles west of them.

The only approximations to the point were made by Mr. Meek. In King's Survey of the 40th Parallel (l. c. 462), Mr. Meek's nearest points of investigation were the shell beds of Sulphur Creek (Bear River); of these he says, "While I am, therefore, willing to admit that facts may yet be discovered that will warrant the conclusion that some of these estuary beds should be included rather in the Cretaceous than in the Tertiary, it seems to me that such evidence must either come from included *vertebrate* remains, etc." This is not very conclusive, and acknowledges in advance the importance of the determination of vertebrates from the same neighborhood (Evanston), and from Bitter Creek, above described. Secondly, in Hayden's Survey, 1870, p. 298, the only determination of the age of coal of the Bitter Creek area is *tertiary* (Hallville). Thirdly, in Hayden's Survey Montana, etc. (1871, p. 375), Mr. Meek enumerates *three species* from this region (Point of Rocks) as cretaceous, *every one with question* as to the determination, which, therefore, decides little as to the age of the beds. In the same way all his Coalville species are marked with question. In his earliest investigation in connection with Mr. Engleman, in Capt. Simpson's Report (1860), he expressly states that the age of the Bitter Creek coal series is *unknown*.

Thus it seems that a knowledge of the literature of the geology of the Bitter Creek coal, shows: I. The Messrs. King and Emmons on stratigraphic evidence referred the lower part to the cretaceous and the upper to the tertiary. That on Palæontological grounds, II. Mr. Lesquereaux regards them as tertiary; III. Mr. Meek's evidence is doubtful;¹ and, IV. Dr. Hayden has believed in a transition series.

Hence it appeared to the speaker, that the explorations directed by Dr. Hayden during the past season had contributed largely to our knowledge, proving the existence of an interruption between the cretaceous and tertiary formations; less it is true than that which exists elsewhere, and similar to that insisted on by Clarence King's survey in the region of Bear River and the Wahsatch country.

Prof. COPE defined a genus of Saurodont Fishes from the Niobrara Cretaceous of Kansas, under the name of *ERISICTHE*. He stated that it agreed with *Portheus* and *Ichthyodectes* in the absence of nutritious dental foramina on the inner face of the

¹ This gentleman has stated in a letter to the writer that the Bitter Creek Beds constitute a "new zone."

dentary bone, and especially with *Portheus* in the irregular sizes of the teeth. The crowns are, however, compressed and knife-like, and closely similar to those of *Saurocephalus*. The typical species was called *Erisichthe nitida*, and was stated to have been discovered in the cretaceous formation of Kansas, near to the Solomon River, by Prof. B. F. Mudge. The enamel of the teeth is smooth and glistening, and their outline acuminate and rather elongate. In the anterior part of the jaw are two teeth much larger than the others, separated by a small tooth. The posterior of these is much compressed, while the anterior is oval in section, with one angular edge. Length of the restored skull between one and two feet.

It was added that the *Portheus angulatus*, Cope, probably belongs to the genus *Erisichthe*, and that it differs from *E. nitida* in its greater size and other features. The genus was further stated to be abundant in certain formations of the Southern States, and in the English chalk. Isolated specimens of large teeth from the latter had been referred to the genus *Saurocephalus* in the Poissons Fossiles, which could not be distinguished from those of the genus newly described.

DECEMBER 24.

The President, Dr. RUSCHENBERGER, in the chair.

Ten members present.

DECEMBER 31.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty members present.

The following reports were read, and referred to the Publication Committee:—

THE LIBRARIAN'S REPORT.

The Librarian respectfully reports that the number of additions to the library from January to December, 1872, inclusive, amounts to 1488.

Of these 250 were volumes, 1230 pamphlets and parts of periodicals, and 8 maps and charts; 1135 were octavos, 310 quartos, 20 duodecimos, 15 folios, and 8 maps.

They were derived from the following sources:—

Societies 706, Editors 139, Authors 188, Wilson Fund 67, Isaac Lea 12, Imperial Botanical Garden of St. Petersburg 11, Thomas